

**DRAFT****Floodplain Assessment for 1992 Site Characterization Field Work**

The Department of Energy (DOE) proposes a project at the Rocky Flats Plant (RFP), located north of Golden, CO, portions of which will take place within 100-year floodplains. The location of RFP is shown in Figure 1. The project is the collection of surface water, ground water, soil, sediment and air samples to identify the nature and extent of contamination. In addition, field surveys and sampling of terrestrial and aquatic biota will be conducted. The site characterization work will be located in Operable Unit (OU) 3 (Off-site Areas), OU 4 (Solar Evaporation Ponds) and OU 9 (Original Process Waste Lines) and will start in January, 1992. Most of the work is expected to occur during 1992, though some will continue into 1993 and later. It is possible that work in OU 4, scheduled for 1992, may be delayed until as late as the decontamination and decommissioning of RFP.

**PROJECT DESCRIPTION**

The site characterization work that will take place in floodplains includes the following:

**OU 3**

OU 3 is located on lands adjacent to the RFP site immediately to the east of the Plant's buffer zone as shown in Figure 2. Vertical soil profile trenches, measuring approximately 9 feet long, 5 feet wide and 4 feet deep, will be dug by a backhoe. Exact locations of the trenches have not been determined, but six trenches are proposed in the general locations shown in Figure 3 which could place them in a floodplain. Eleven samples will be collected from various depths in each trench. One of these trenches is typically dug and filled within a day. The soil removed from the trench will be used to backfill it. Because of the short duration and character of this activity, it is not expected to have any adverse impacts to floodplains.

Surficial soil samples will be collected within approximately 12-miles of RFP as shown in Figure 4. Surface soil scrapes will be taken with a small, hand-held device which collects 2 to 3 tablespoons of soil from the top one-quarter inch of the ground. Twenty-five soil scrapes will be taken from each of 60 10-acre areas generally to the east of RFP. Virtually any of the soil scrapes has the potential to be taken from within a floodplain. No adverse impacts to floodplains are expected because of the non-invasive character of the activity.

Sediment samples will be obtained from the sites indicated in Figure 5. Sediment sampling involves single or repeated visits to sampling stations to collect up to a few pounds of sediments. Both new and existing sediment sampling stations will be used. A new sediment sampling station is established by driving a metal fence post into the ground to mark a site which can be returned to in the future. Some of the sediment sampling stations are, or will be, located on streams or ditches while others will be located on the shores or under the waters of ponds, lakes or reservoirs. Vertical sediment profile samples will be taken from reservoir bottoms by dropping a tube through the water into the sediment. The bottom of the tube closes and up to three feet of sediment can be withdrawn for analysis. Sediment grab samples will also be taken from the top 2 to 3 inches of reservoir bottoms. By their nature, all sediment sampling stations and sediment sample collection activities will be in floodplains. Because of the non-invasive character of this activity, it is not expected to have any adverse impacts to floodplains.

**ADMIN RECORD**

Surface water will be sampled at the locations shown in Figure 6. Surface water sampling involves single or repeated visits to sampling locations to gather up to a few quarts or gallons of water. Both new and existing surface water sampling stations will be used. A new surface water sampling station is established by driving a metal fence post into the ground to mark a site which can be returned to in the future. Some of the surface water sampling stations are, or will be, located on streams or ditches while others will be located on the shores or waters of ponds, lakes or reservoirs. By their nature, virtually all surface water sampling stations and sample collection activities will be in floodplains. No adverse impacts to floodplains are anticipated because of the non-invasive character of this activity.

Four new ground water monitoring wells will be drilled. Two will be immediately below the dams of both Great Western Reservoir and Standley Lake as shown in Figure 7. These locations are in the floodplains of Walnut and Big Dry Creeks respectively. In well drilling, the advancing drill bit produces cuttings which are shoveled into drums pending analysis for contaminants, storage, treatment and ultimate disposal. Wells are characteristically on the order of 6 inches in diameter and 15 to 60 feet deep, though some may be deeper. Once the well is in place, a casing is installed to ensure the integrity of the well and enable the well to draw water from the intended depths. When drilling is completed, surface evidence of the activity is downed vegetation around the immediate site and a 6 inch pipe extending 2 to 3 feet above the ground. When they have served their purpose, the wells will be abandoned in accordance with RFP standard operating procedures (plugging and capping). Some new ground water sampling wells may be located in floodplains but, because of the very low impacts of the drilling activity, no adverse affects on floodplains are anticipated. To collect water samples from ground water monitoring wells, a collection device is lowered into a well where it fills with water. The device is then pulled back to the surface and the water is poured into another container.

Site characterization work at OU 3 will include establishment and operation of air and meteorological monitoring stations. Three types of air sampling and meteorological monitoring will occur at OU 3. The locations of all three activities are shown in Figure 7. One will be installation of three new high-volume air samplers. Two of the samplers will be located at Standley Lake while the third will be at a site to be selected in a residential area near the Lake. An air sampler is a piece of equipment housed in a stainless steel box approximately 2 feet on a side. Installation of an air sampler involves pouring a concrete pad on which the air sampler is mounted, and making provisions to bring electric power to the site. The concrete pads, together with the samplers, will be removed when the study is completed. One of the samplers will be located in, or near, the southwestern floodplain of Standley Lake but in an area unlikely to be inundated by anything other than a larger (50 or 100 year) storm event. Because of the non-invasive character of this activity, it is not expected to have any adverse floodplain impacts.

The second activity is installation of two new meteorological monitoring stations. Each of the stations consists of a 6-meter tower on a small concrete pad. The towers may be fenced if necessitated by the presence of livestock or other considerations. Each tower will hold instruments to measure meteorological characteristics and may be supported by guy wires. One of the meteorological towers will be located at a terrestrial site approximately a mile east of the eastern RFP, south of Great Western Reservoir. The second meteorological tower will be located with one of the air samplers in, or near, the southwestern floodplain of Standley Lake, but in an area unlikely to be inundated by anything other than a larger (50 or 100 year) storm event. Because of the non-invasive character of the installation and operation of the meteorological towers, no adverse impacts to the floodplain are expected.

The third activity in the OU 3 air sampling program is use of small and medium-sized portable wind tunnels to characterize and measure the ability of winds at various speeds to move sediments on and from the exposed areas of the Standley Lake bed. The wind tunnel devices will be mounted on a small trailer and have an open-floored test section which will be placed over the surface of the lake bed to be tested. Air will be drawn through the test section at controlled velocities. The air stream will pass through a duct fitted

with a filter which will collect particulates raised from the lake bed by the wind. The particulate samples will be sent to a laboratory to identify their volume and constituents. Six tests will be conducted at each of three sites in late summer when soil moisture is generally at its lowest level. Each of the tests will take about one day. One site will be on the bed of Standley Lake, the second on the bed of Great Western Reservoir, and the third on a yet-to-be-identified highland site (i.e., not on a lake bed) south of Great Western Reservoir. The first two sets of tests will necessarily take place within the floodplains of Standley Lake and Great Western Reservoir, but, because of their nature and short duration, the tests are not expected to have any adverse impacts to the floodplains.

Terrestrial and aquatic biota sampling locations are presented in Figure 8. The samples will be gathered using standard collection techniques, e.g., vegetative clipping, live animal trapping and field surveys. These activities will typically continue for a year. Flora and fauna samples will be collected in floodplains but, because of the non-invasive character of this activity, no adverse floodplain impacts are anticipated.

#### OU 4

The location of OU 4 is shown in Figure 9. Site characterization work at OU 4 will include four types of field work that will take place within floodplains. The first is conduct of a radiological survey. The survey will consist of a surveyor taking one-minute readings with a gamma probe (a device for measuring gamma radiation) held at about waist height at each of the approximately 350 locations shown in Figure 10. The surveyor will also take readings of alpha radiation at the same locations. Alpha readings will be obtained from eight locations on a 5 foot radius from the station with the alpha counter held 4 to 6 inches from the ground. Approximately 15 of the 350 sites are in the floodplain of Walnut Creek. Because of the very non-invasive character of this activity, it is not expected to have any adverse floodplain impacts.

Approximately 35 surficial soil sample will be taken at OU 4 at the locations shown in Figure 10. At each location, two 1 meter-square areas will be located 1 meter apart. Samples will be collected to a depth of 1 inch with either a plug-type collector or a scoop. Three of the surficial soil sample sites are located in the Walnut Creek floodplain but, because of the very non-invasive character of this activity, it is not expected to have any adverse floodplain impacts.

Borehole drilling is the third type of activity that will take place in the Walnut Creek floodplain at OU 4. Approximately four boreholes will be drilled in the floodplain on the south side of Walnut Creek at the locations presented in Figure 11. Drilling boreholes involves the same procedures as drilling wells. A drill rig is driven to the site and drills the borehole, typically within a day. The advancing drill bit produces a core of soil and/or rock which is preserved for analysis, and drill cuttings which are shoveled into drums pending analysis for contaminants, storage, treatment and ultimate disposal. Boreholes are characteristically 6 inches in diameter and 15 to 60 feet deep, though some may be deeper. When drilling is completed, surface evidence of the activity is downed vegetation around the immediate site and a 6 inch pipe extending 2 to 3 feet above the ground. Some boreholes may be completed as wells by installation of a well casing and screen. When they have served their purpose, boreholes and wells will be abandoned in accordance with RFP standard operating procedures (plugging and capping). Some new boreholes may be located in floodplains but, because of the very low impacts of the drilling activity, no adverse floodplain affects are anticipated.

Finally, samples of flora and fauna will be taken at selected sites in OU 4, some in the floodplain. Representative locations are shown in Figure 12. Because of the non-invasive character of this activity, it is not expected to have any adverse floodplain impacts.

## **OU 9**

The location of OU 9 is shown in Figure 13. The OU consists of a system of underground pipelines, shown as dashed lines in the Figure. Field work at OU 9 that will be in a floodplain is limited to flora and fauna sampling and the possibility of some excavation at the extreme eastern end of the OU in the headwaters of South Walnut Creek as indicated in Figure 14. Flora and fauna sampling activities will be generally the same as those undertaken in OU 4 and, similarly, will have no adverse impacts to the floodplain.

Certain portions of OU 9 extend east of the Protected Area (PA), the high security area of RFP, and may enter the floodplain of Walnut Creek or South Walnut Creek. It is not clear from existing documents if the pipeline system in this area has been removed, so field work may be undertaken along the length of the two easternmost lines. One of these lines is believed to terminate near South Walnut Creek between the two security fences and may be in the floodplain in that area. The second line may extend along the top of the ridge for a distance of approximately 2,000-2,500 feet east of the PA fence, possibly as far as Pond B-2. If it still exists, a portion of this line could also be in a floodplain. Field work along both lines would consist of excavations by backhoe and/or soil sampling on 200-foot centers.

## **EFFECTS**

Because of the non-invasive character or very low impacts and short duration of the floodplain activities of this project, it is expected that the project will have essentially no positive or negative, direct or indirect, or long-term effects on floodplains. Short-term effects will include the downing or clipping of small areas of vegetation and the disturbance of small areas of soil from the excavation of soil test pits. None of the site characterization activities will have any affect on lives or property or on the natural and beneficial values of the floodplains.

## **ALTERNATIVES**

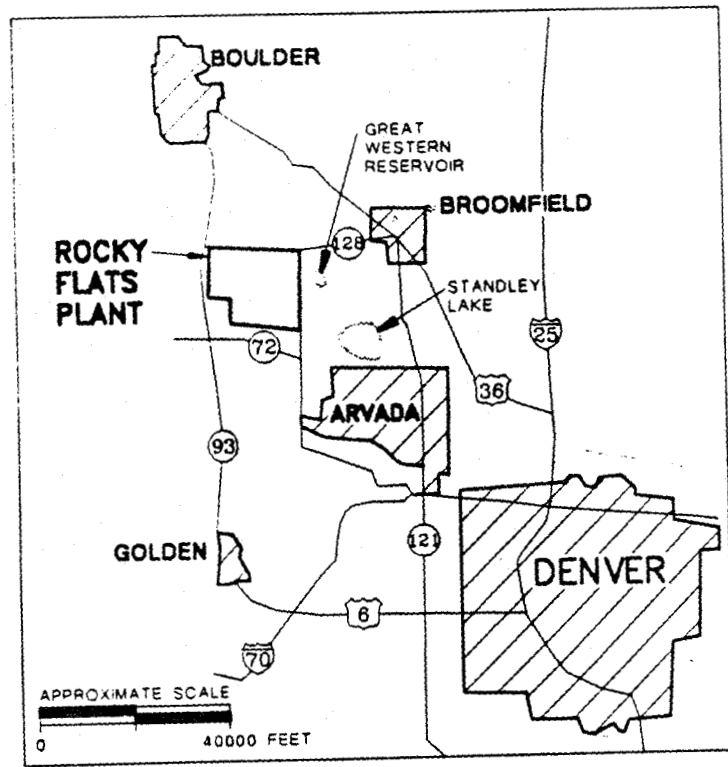
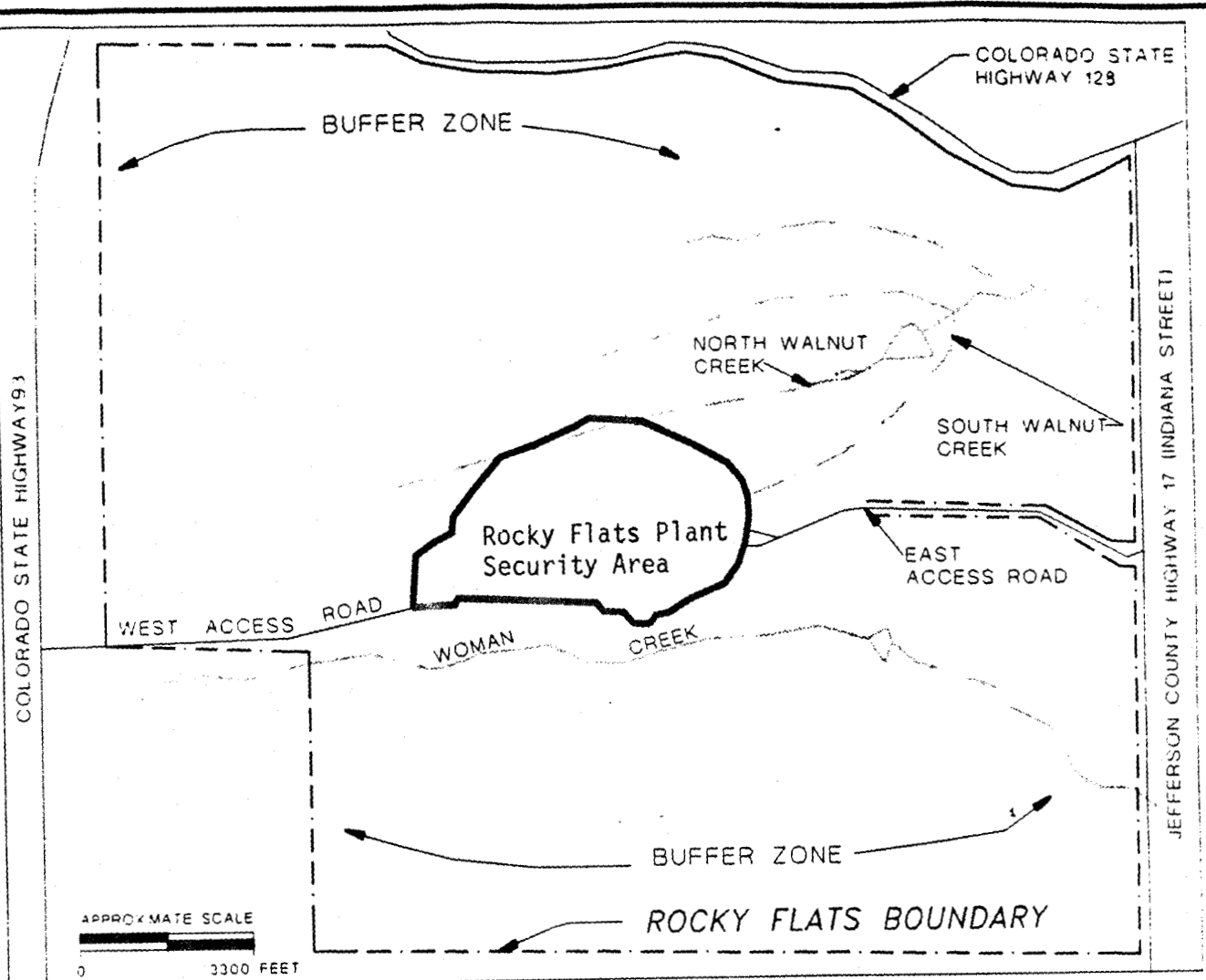
DOE is required by statute (Comprehensive Environmental Response, Compensation and Liability Act, Resource Conservation and Recovery Act) and by Agreement (Inter-Agency Agreement with the Environmental Protection Agency and the Colorado Department of Health) to clean-up contaminated areas at RFP. Clean-up activities cannot be initiated until the sites to be cleaned have been characterized to identify the nature and extent of the contamination and the physical characteristics of the site. The activities that constitute this project are designed to do exactly that. Developing alternatives to the site characterization program is considered unnecessary because attempting remediation without site characterization is unreasonable and the site characterization activities will have no significant impacts to floodplains.

## **MITIGATION**

Because there are no significant impacts to floodplains from the project, mitigation is not required. Certain guidelines will be followed, however, to protect the environment. They are:

1. All vehicles will stay on established roads or tracks to the maximum extent feasible.
2. Activities will be scheduled to the extent possible to avoid high soil moisture conditions when vehicles might cause excessive damage to the terrain.

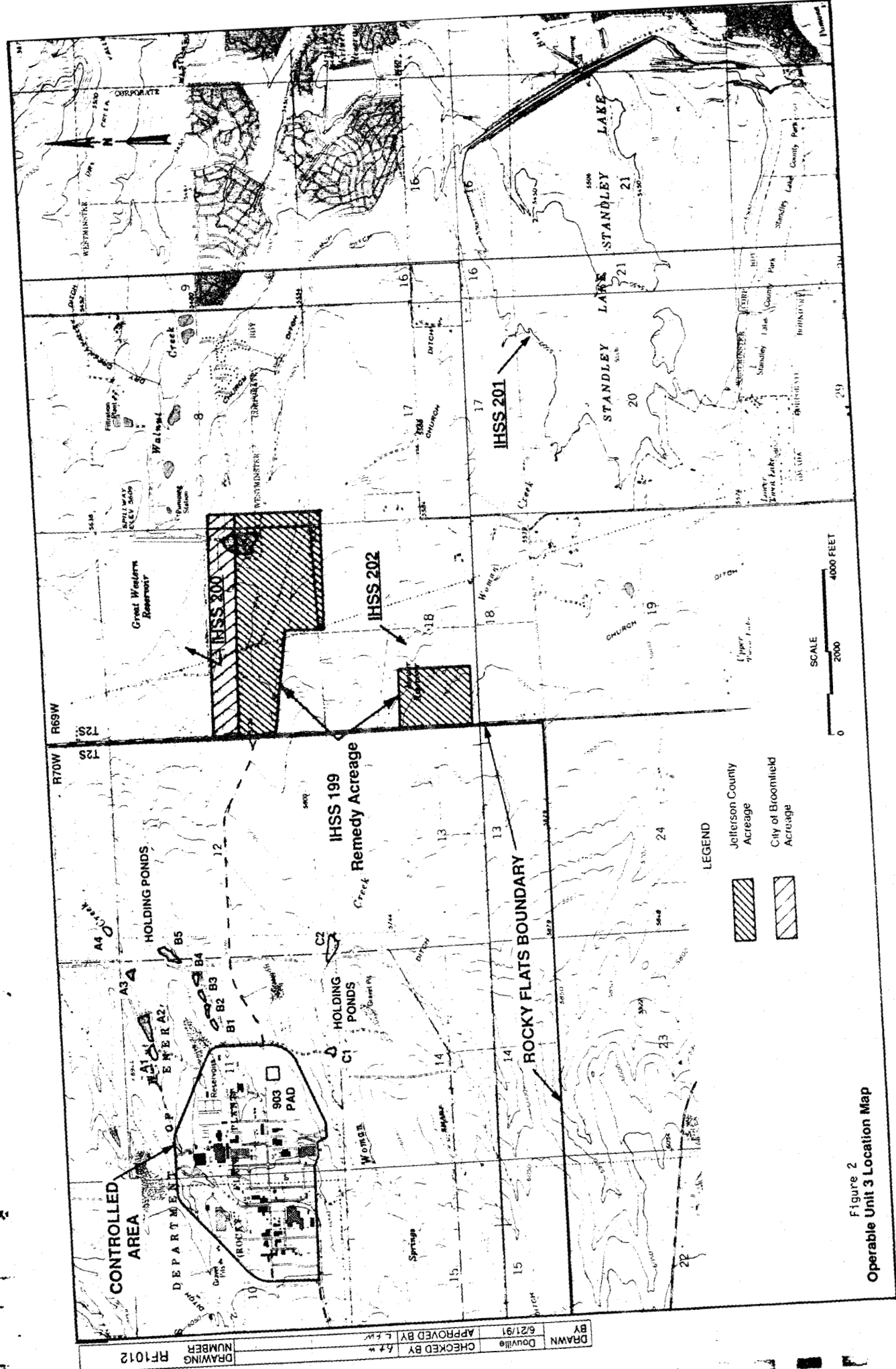
COLORADO STATE HIGHWAY 93



PREPARED FOR:			
<b>U.S. DEPARTMENT OF ENERGY</b>			
Rocky Flats Plant Golden, Colorado			
<b>FIGURE 1</b>			
TITLE:			
Rocky Flats Plant Location Map			
PROJ. NO.	304909	DWG. NO.	304909-A55 SHEET
DESIGN BY	G. BRAND	CHECKED	G. BRAND
DRAWN BY	R. HYNIA	APPROVED	G. BRAND
DATE	10/10/91	SCALE	AS NOTED

4909A55 10/22/91 11:16am AWK

ADAPTED FROM FIG. 1-1, EG & G DRAFT GEOLOGIC CHARACTERIZATION REPORT, JAN. 3, 1990.



DRAWING	RF1012
NUMBER	
CHECKED BY	6.7
APPROVED BY	6.7
DATE	6/21/91
DRAWN BY	Douville

Figure 2  
Operable Unit 3 Location Map

DRAWN	10/31/91	CHECKED BY	11/21/91	DRAWING	RF1001
BY	10/31/91	APPROVED BY	11/22/91	NUMBER	

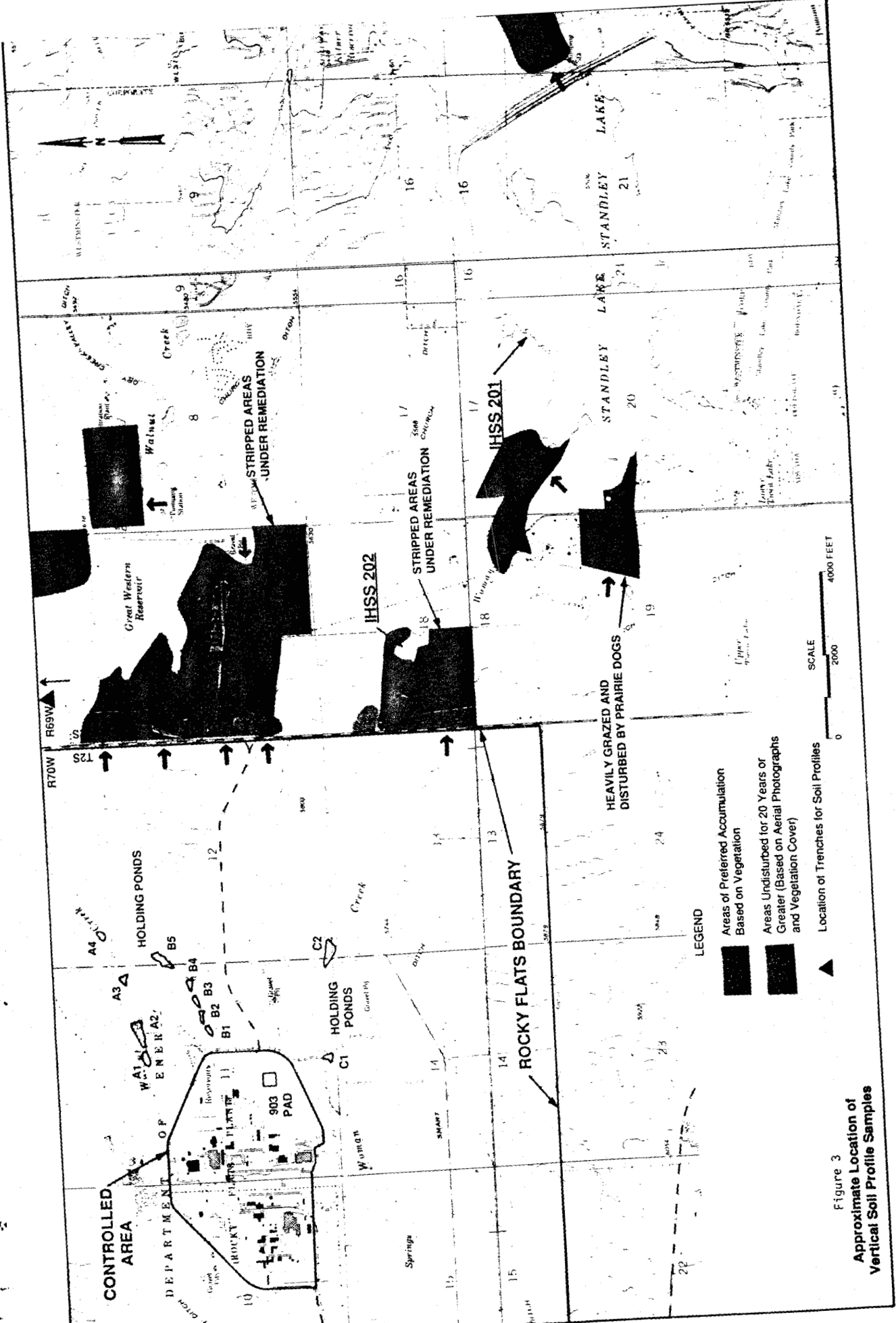
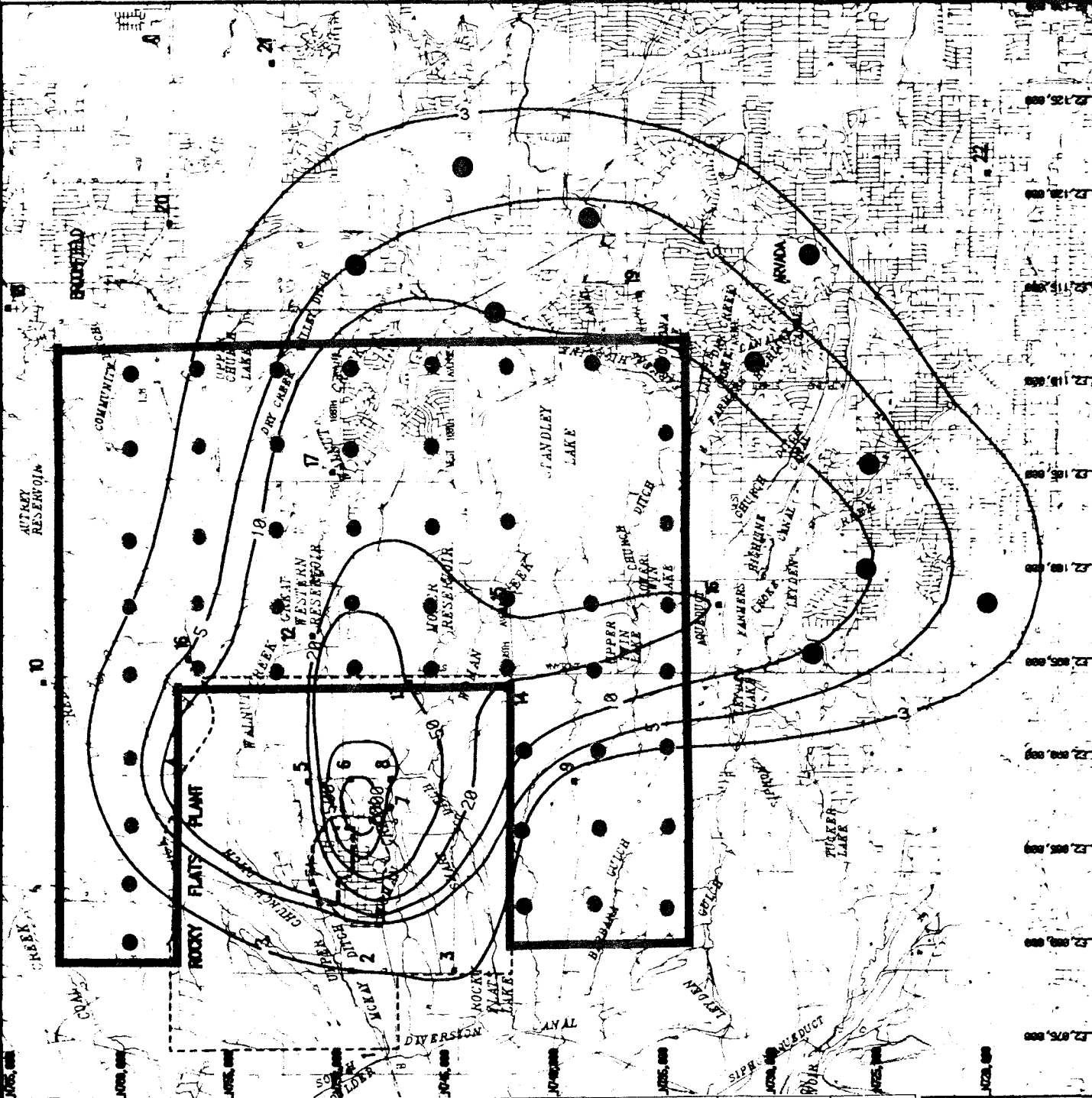


Figure 3  
Approximate Location of  
Vertical Soil Profile Samples

DRAWN	Douville	CHECKED BY	11/01/91	APPROVED BY	A. Lange	10/28/91	DRAWING NUMBER	RF1003
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**MAP LEGEND**

- RFP Boundary and PSZ
- Contour Values in mCi per Km<sup>2</sup>
- Numbered Sampling Sites
- Soil Grid Sample Locations (plutonium, americium, and uranium analyses) - Each Sample Location is a 10 Acre Plot where 25 Subsamples will be Collected to Form 1 Composite Sample (CDH Method)
- Samples Outside of Soil Grid

0 3400 6800  
SCALE IN FEET

Figure 4  
Approximate Soil Sampling Locations for Soil Survey and Plutonium-239 Contours in the Vicinity of the Rocky Flats Plant (Krey and Hardy, 1970)

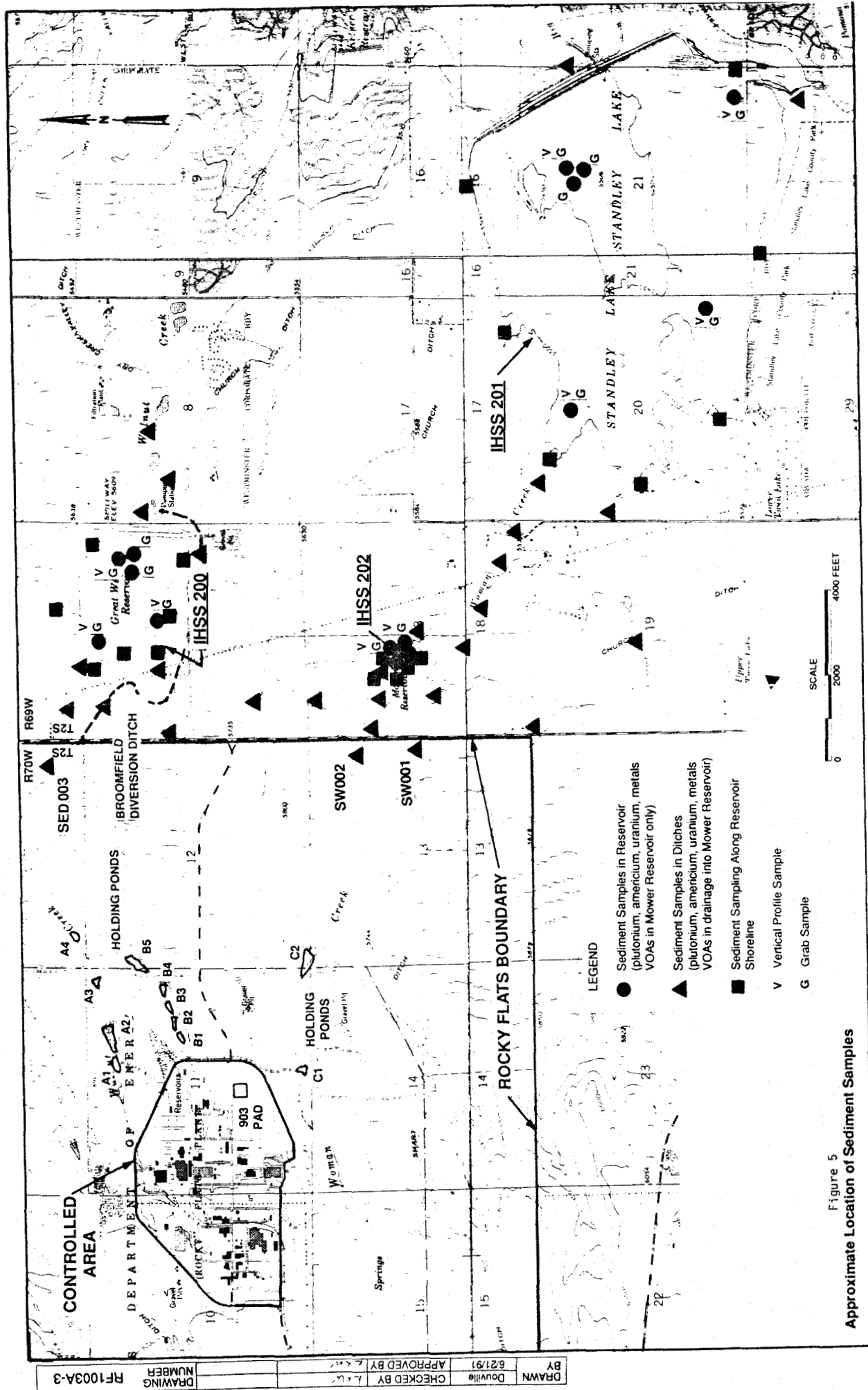
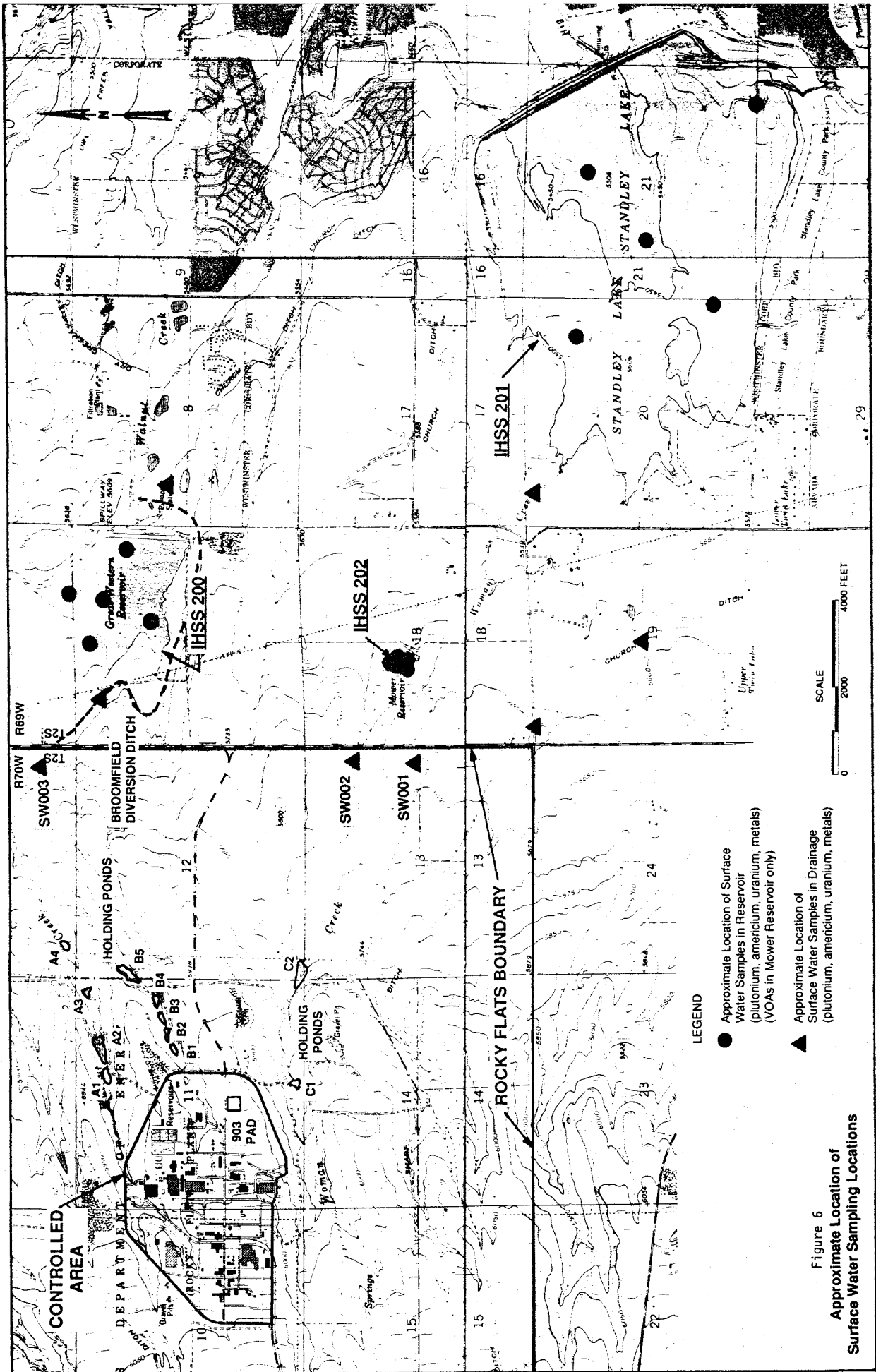


Figure 5  
Approximate Location of Sediment Samples



- LEGEND**
- Approximate Location of Surface Water Samples in Reservoir (plutonium, americium, uranium, metals) (VOAs in Mower Reservoir only)
  - ▲ Approximate Location of Surface Water Samples in Drainage (plutonium, americium, uranium, metals)

Figure 6  
Approximate Location of  
Surface Water Sampling Locations

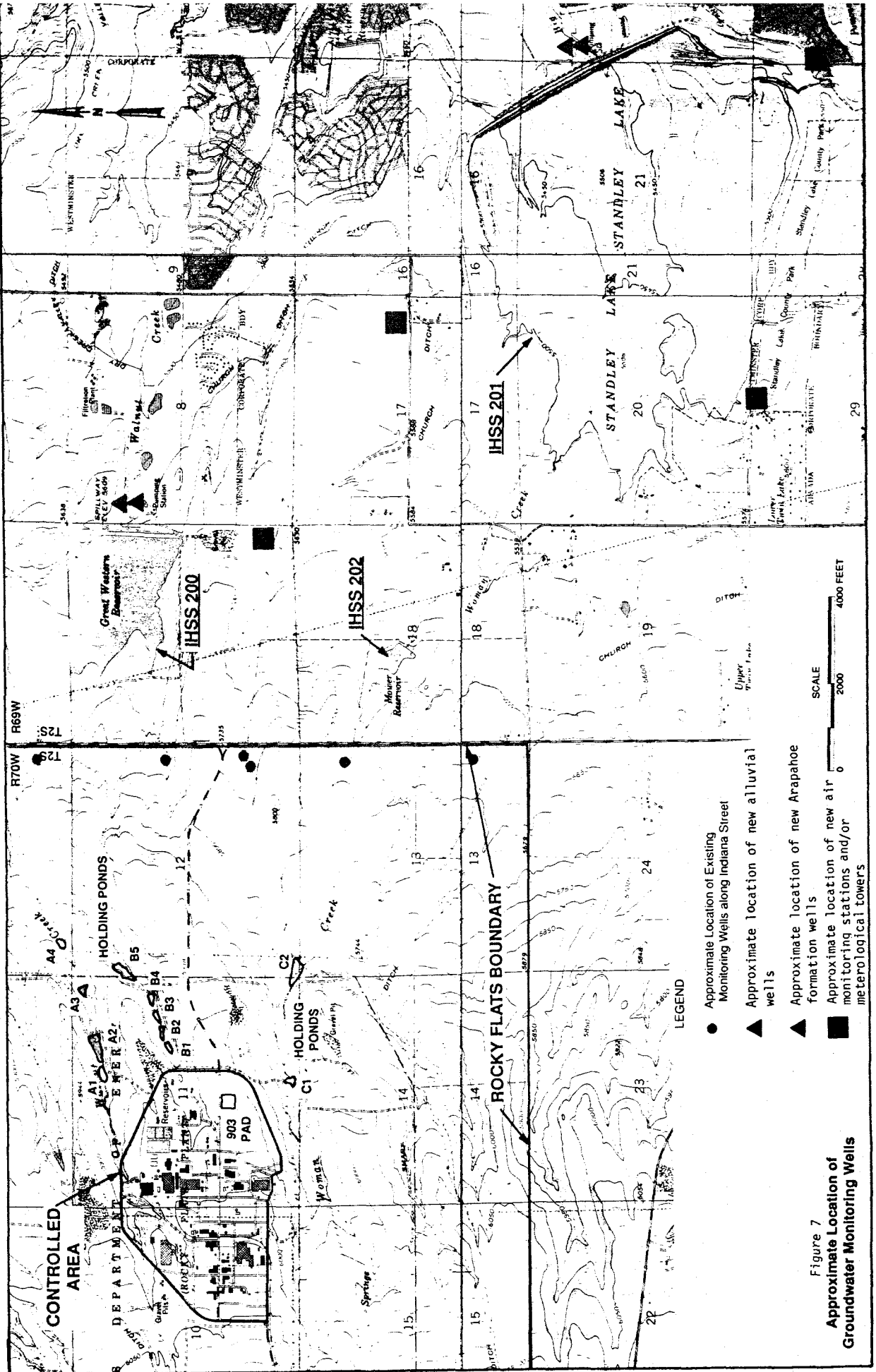
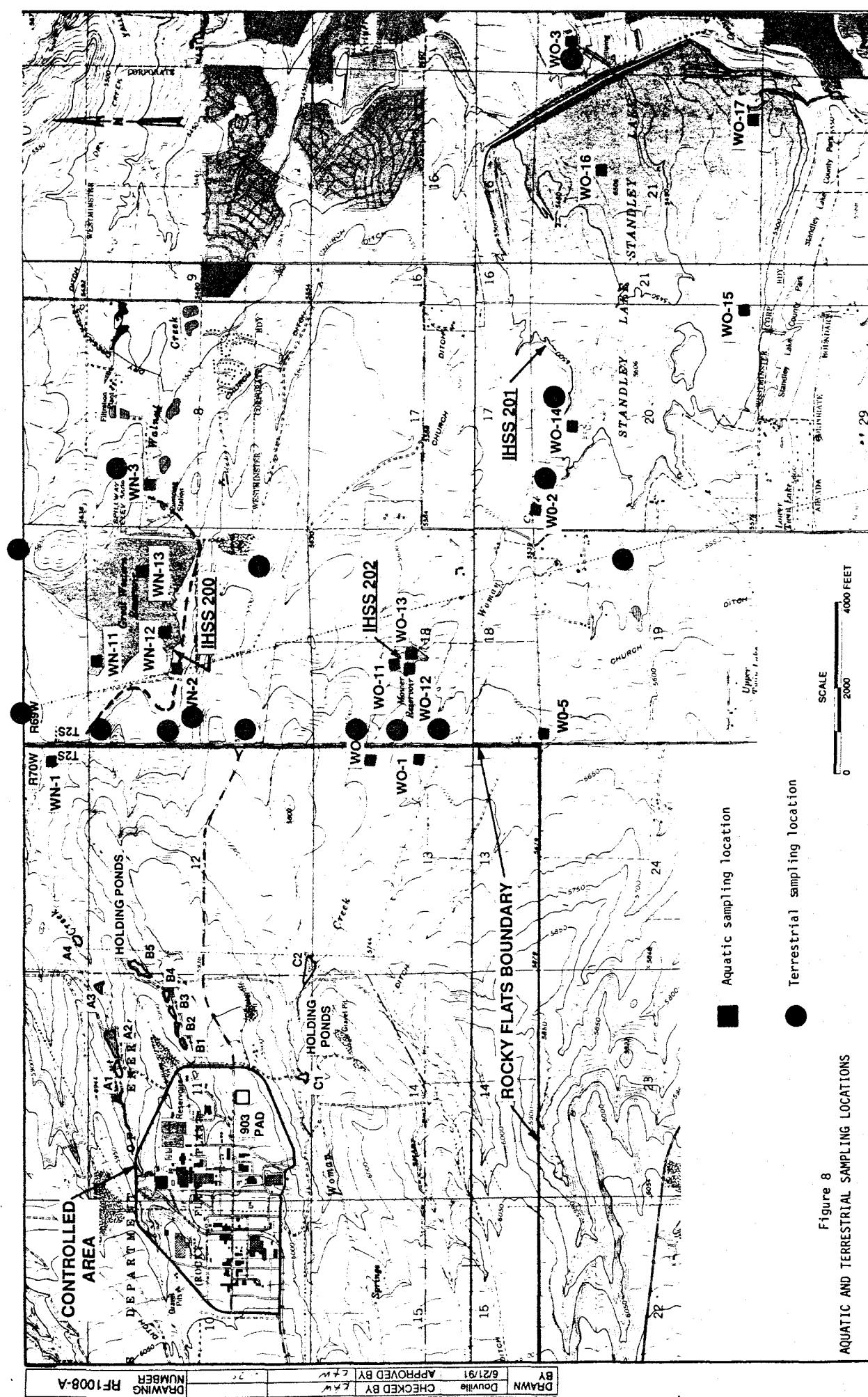


Figure 7  
 Approximate Location of  
 Groundwater Monitoring Wells



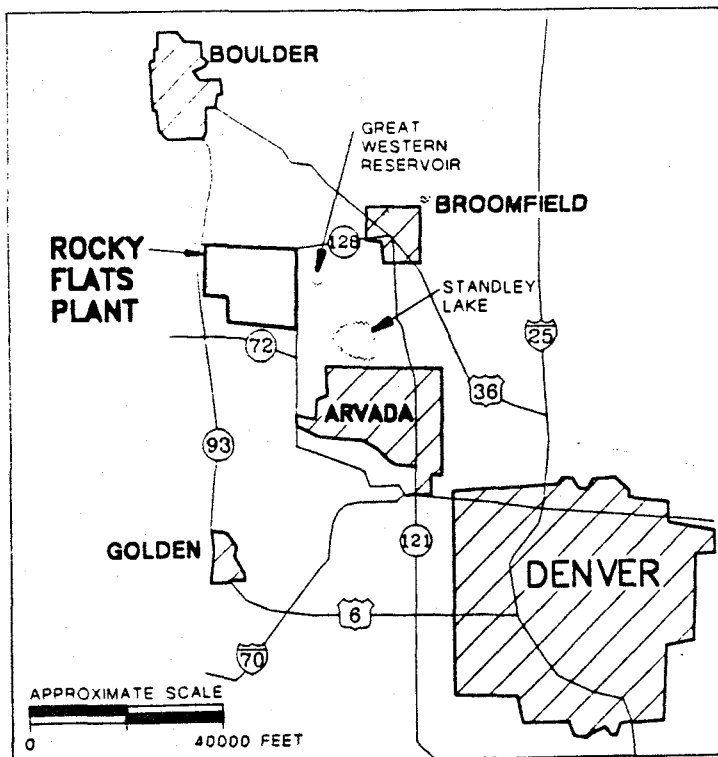
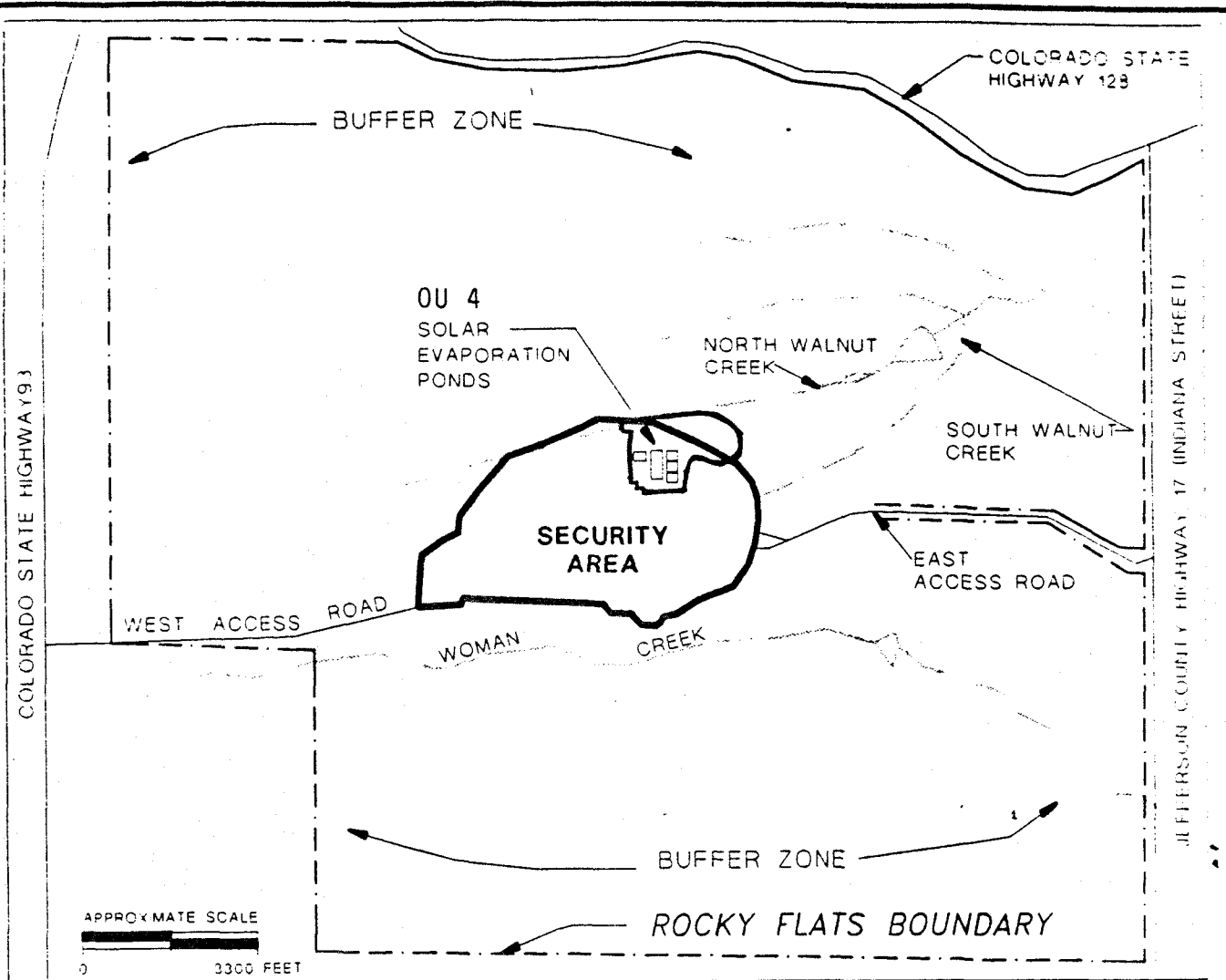
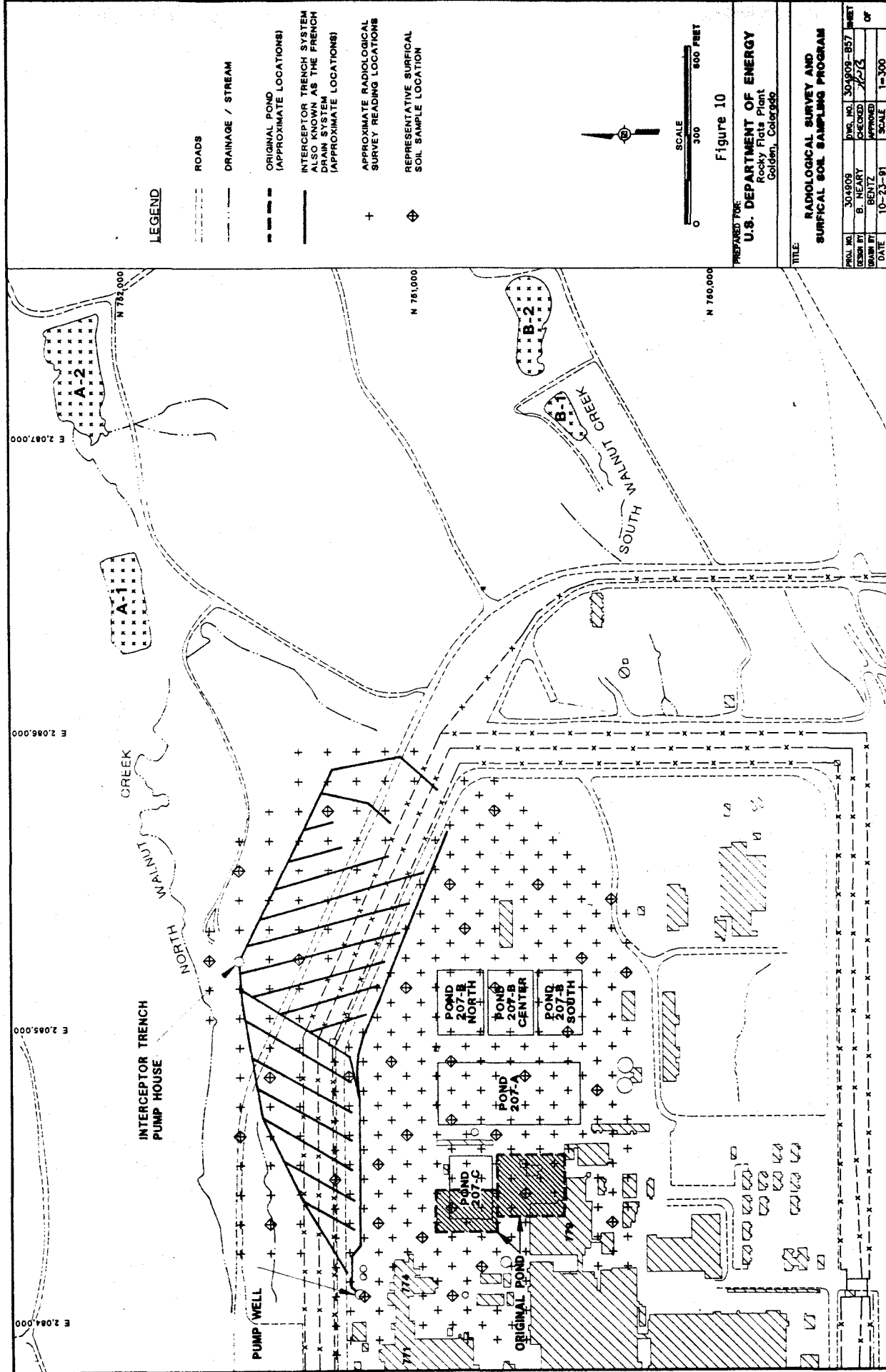


Figure 9

PREPARED FOR:			
<b>U.S. DEPARTMENT OF ENERGY</b>			
Rocky Flats Plant			
Golden, Colorado			
TITLE:			
<b>OU 4 LOCATION MAP</b>			
PROJ. NO.	304909	DWG. NO.	304909-A55 SHEET
DESIGN BY	G. BRAND	CHECKED	G. BRAND
DRAWN BY	R. HYNÄ	APPROVED	G. BRAND
DATE	10/10/91	SCALE	AS NOTED

ADAPTED FROM FIG. 1-1, E.G. & G. DRAFT GEOLOGIC CHARACTERIZATION REPORT, JAN. 3, 1990



**LEGEND**

- ROADS
- DRAINAGE / STREAM
- ORIGINAL POND (APPROXIMATE LOCATIONS)
- INTERCEPTOR TRENCH SYSTEM ALSO KNOWN AS THE FRENCH DRAIN SYSTEM (APPROXIMATE LOCATIONS)
- APPROXIMATE RADIOLOGICAL SURVEY READING LOCATIONS
- REPRESENTATIVE SURFICIAL SOIL SAMPLE LOCATION

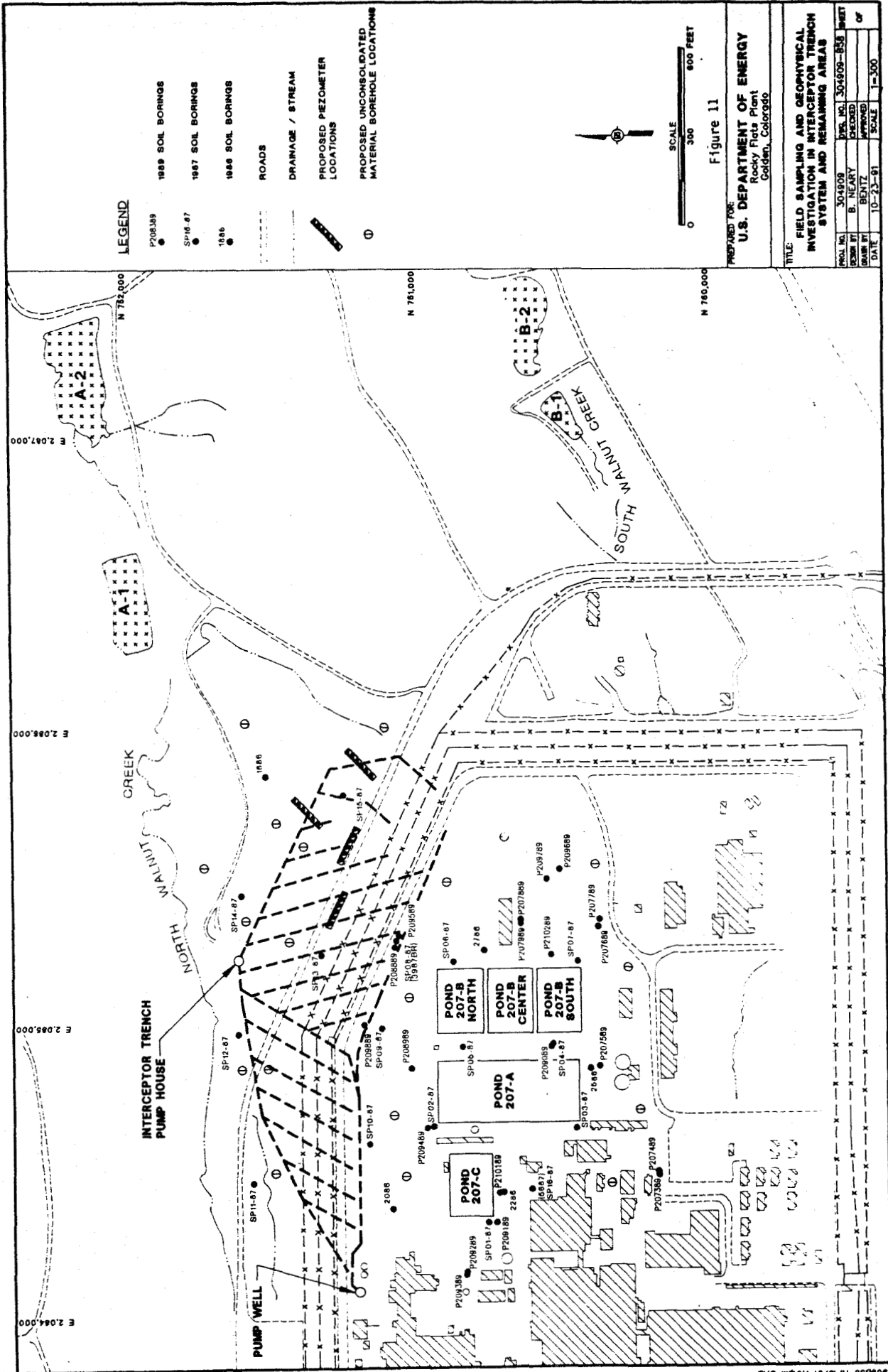
SCALE  
0 300 600 FEET

Figure 10

PREPARED FOR  
**U.S. DEPARTMENT OF ENERGY**  
Rocky Flats Plant  
Golden, Colorado

TITLE  
**RADIOLOGICAL SURVEY AND  
SURFICIAL SOIL SAMPLING PROGRAM**

PROJ. NO.	304809	DWG. NO.	304809-B57	SHEET	1
DESIGN BY	B. HEARY	CHECKED	K. J. C.	DATE	10-23-91
DRAWN BY	BENTZ	APPROVED		SCALE	1"=300'



**LEGEND**

- 1985 SOIL BORINGS  
P208189
- 1987 SOIL BORINGS  
SP16-87
- 1988 SOIL BORINGS  
1886
- ROADS
- DRAINAGE / STREAM
- PROPOSED PEIZOMETER LOCATIONS
- PROPOSED UNCONSOLIDATED MATERIAL BOREHOLE LOCATIONS

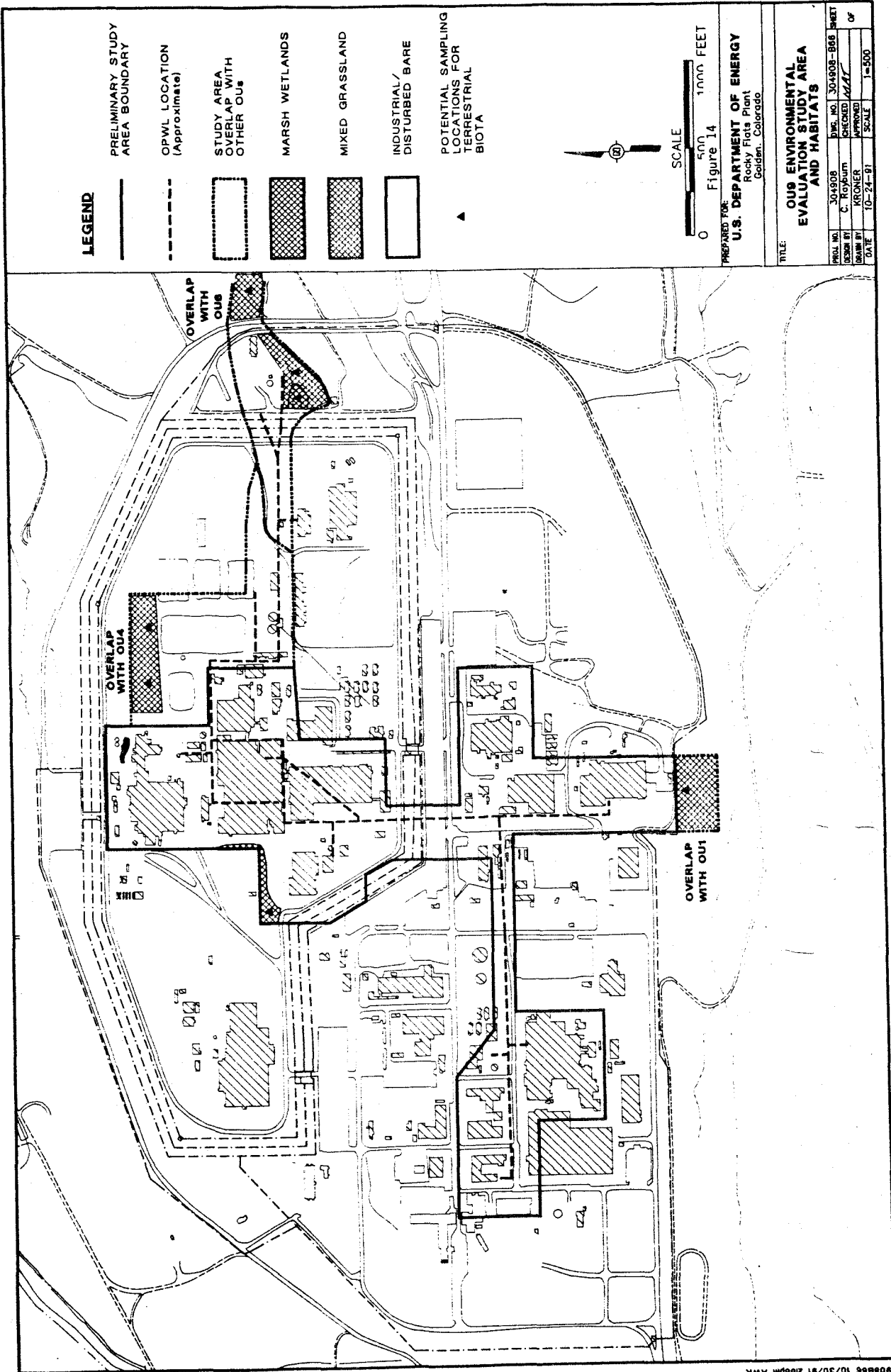


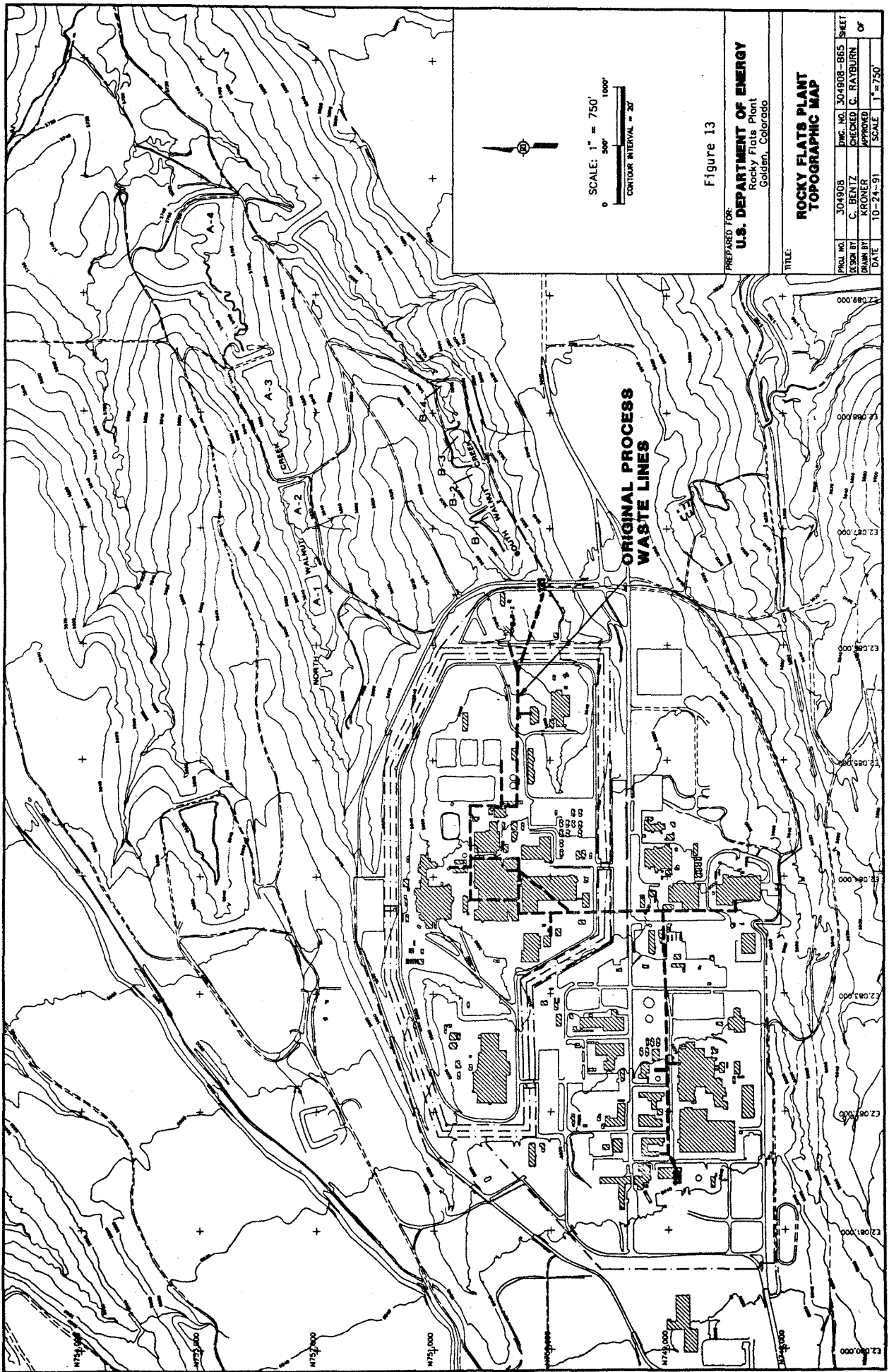
Figure 11

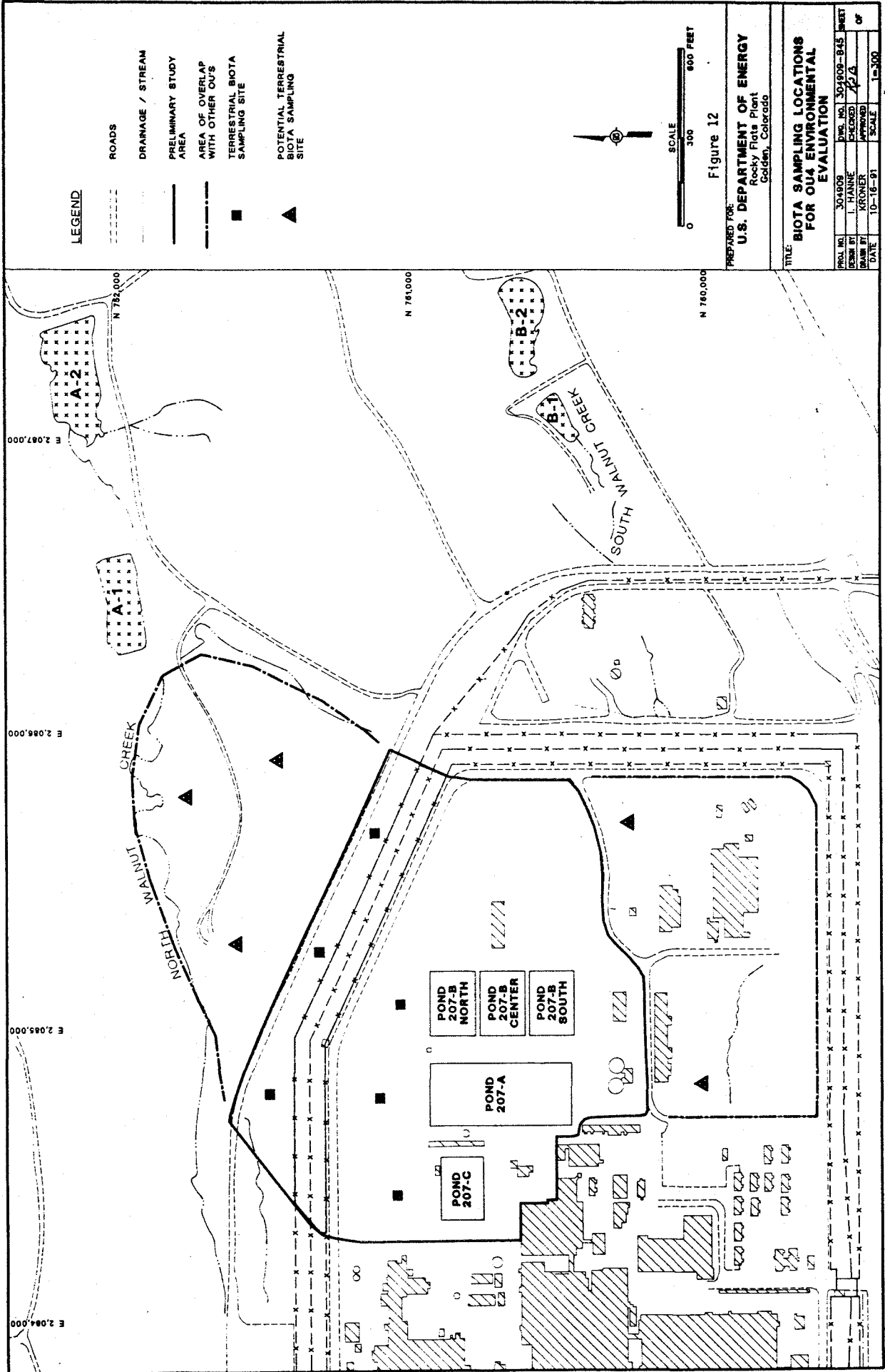
PREPARED FOR:  
**U.S. DEPARTMENT OF ENERGY**  
Rocky Flats Plant  
Golden, Colorado

TITLE:  
**FIELD SAMPLING AND GEOPHYSICAL INVESTIGATION IN INTERCEPTOR TRENCH SYSTEM AND REMAINING AREAS**

ROLL NO.	304909	FIG. NO.	304909-858	SHEET
DESIGN BY	B. HEARY	DESIGNED BY		OF
DRAWN BY	BENNY	DRAWN BY		
DATE	10-23-91	SCALE	1"=300'	







**LEGEND**

- ROADS
- DRAINAGE / STREAM
- PRELIMINARY STUDY AREA
- AREA OF OVERLAP WITH OTHER OUS
- TERRESTRIAL BIOTA SAMPLING SITE
- POTENTIAL TERRESTRIAL BIOTA SAMPLING SITE

SCALE  
0 300 600 FEET

Figure 12

PREPARED FOR:  
**U.S. DEPARTMENT OF ENERGY**  
Rocky Flats Plant  
Golden, Colorado

TITLE:  
**BIOTA SAMPLING LOCATIONS  
FOR OU4 ENVIRONMENTAL  
EVALUATION**

PROJ. NO.	304909	304909-B45	SHEET
DESIGN BY	L. HANNE	EXAMINED	2/4
DRAWN BY	KRONER	APPROVED	
DATE	10-18-91	SCALE	1"=300'